Kramer Electronics, Ltd.

USER MANUAL

Model:

VA-2H

EDID Reader-Emulator

Contents

1	**Introduction**	**1**
2	**Getting Started**	**1**
2.1	Quick Start	2
3	**Overview**	**3**
3.1	Defining EDID	4
3.2	About HDCP	4
3.3	About HDMI	4
4	**Your VA-2H EDID Reader-Emulator**	**5**
5	**Connecting the VA-2H EDID Reader-Emulator**	**6**
6	**Operating the VA-2H EDID Reader-Emulator**	**7**
6.1	Operating from the Front Panel	7
6.2	Operating from the EDID Designer	8
7	**The EDID Designer**	**8**
7.1	Installing the USB Driver	9
7.2	Installing the EDID Designer	14
7.3	Using the EDID Designer	15
7.3.1	Menu Commands	16
7.3.2	Toolbar Buttons	16
7.3.3	Status Section	17
7.3.4	EDID Definition Tabs and Parameters	17
7.3.5	Online Status	20
8	**Technical Specifications**	**20**

Figures

Figure 1: VA-2H EDID Reader-Emulator 5
Figure 2: Connecting the VA-2H 7
Figure 3: EDID Designer Main Window – Limited View 14
Figure 4: EDID Designer Main Window – Extended View 15
Figure 5: EDID Designer – General Tab 17
Figure 6: EDID Designer – Display Tab 18
Figure 7: EDID Designer – Color Tab 18
Figure 8: EDID Designer – Established Timing Tab 19
Figure 9: EDID Designer – Standard Timing Tab 19
Figure 10: EDID Designer – Detailed Timing Tab 20

Tables

Table 1: VA-2H EDID Reader-Emulator Functions 6
Table 2: EDID Designer Menu Items 16
Table 3: EDID Designer Toolbar Buttons 16
Table 4: EDID Designer Status Section 17
Table 5: EDID Definition Tabs 17
Table 6: VA-2H Technical Specifications 20

1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Thank you for purchasing the Kramer DigiTOOLS® **VA-2H** *EDID Reader-Emulator,* which is ideal for creating, modifying and saving EDIDs on the computer.

Note, that the Kramer VA-2H is identical to the VA-2HDMI; just the name has changed replacing the suffix "HDMI" by "H" (according to the HDMI Guideline).

Each package includes the following items:

- The **VA-2H** *EDID Reader-Emulator*
- Windows®-based Kramer application software
- Power supply (12V DC)
- This user manual[2]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high-performance high-resolution cables[3]

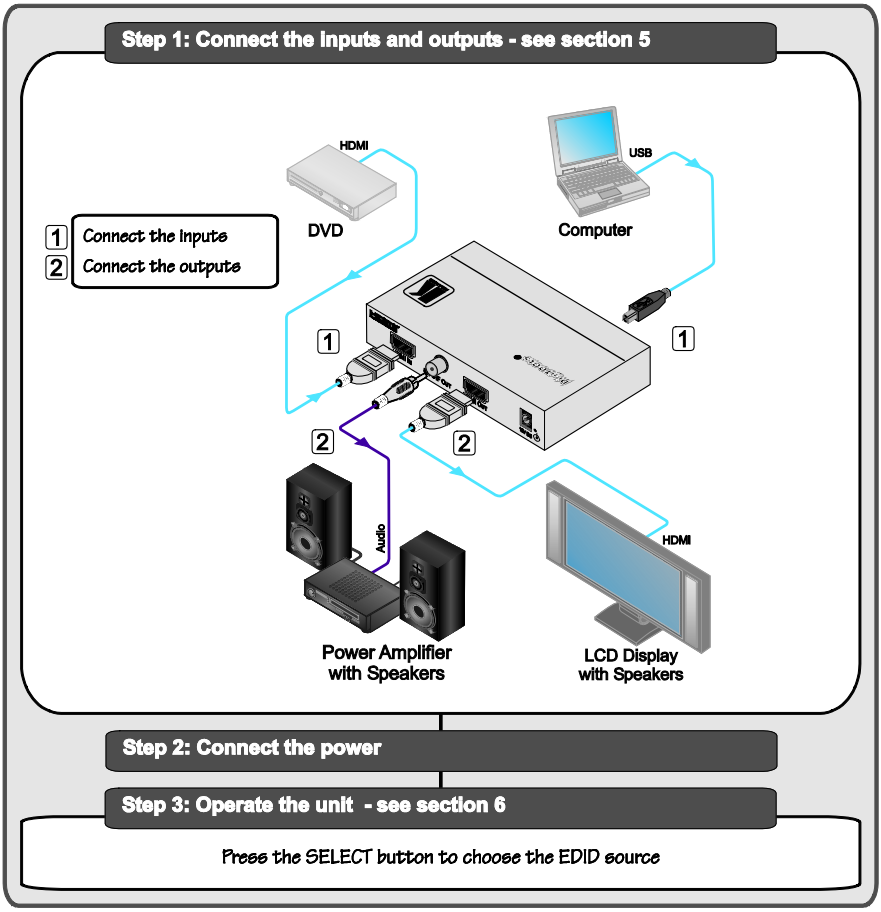
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Download up-to-date Kramer user manuals from our Web site at http://www.kramerelectronics.com

3 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.



3 Overview

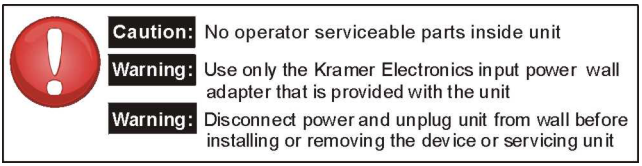
The **VA-2H** is a diagnostic and debugging tool for installers working with HDMI devices. The unit can switch three different EDIDs to the HDMI input. A software editor lets you manipulate various parameters of the EDID via the unit's USB port.

The **VA-2H** features:

- A frequency of up to 2.25GHz
- An input resolution of up to 1080p @60Hz 36bit
- HDCP 1.1, and DVI 1.0 compliance
- HDMI Support – HDMI (V.1.4 with Deep Color, x.v.Color™, Lip Sync, HDMI Uncompressed Audio Channels, Dolby TrueHD, DTS-HD)
- I-EDIDPro™ Kramer Intelligent EDID Processing™, an Intelligent EDID handling and processing algorithm that ensures Plug and Play operation for HDMI systems
- Three EDID parameter modes – monitor, default and user
- Input, output and HDCP LED indicators
- Application software for manipulating the EDID data
- The last EDID mode (Monitor, Default or User) is saved in case of a sudden power interruption

To achieve the best performance:

- Use only good quality connection cables[1] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **VA-2H** away from moisture, excessive sunlight and dust


Caution:
No operator serviceable parts inside unit
Warning:
Use only the Kramer Electronics input power wall adapter that is provided with the unit
Warning:
Disconnect power and unplug unit from wall before installing or removing the device or servicing unit

1 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com

3.1 Defining EDID

The Extended Display Identification Data (EDID[1]) is a data-structure, provided by a display, to describe its capabilities to an HDCP source. The EDID enables the **VM-2H** to "know" what kind of monitor is connected to the output. The EDID includes the manufacturer's name, the product type, the timing data supported by the display, the display size, luminance data and (for digital displays only) the pixel mapping data.

3.2 About HDCP

The High-Bandwidth Digital Content Protection (HDCP) standard[2], protects digital video and audio signals transmitted over DVI or HDMI connections between two HDCP-enabled devices to eliminate the reproduction of copyrighted material. To protect copyright holders (such as movie studios) from having their programs copied and shared, the HDCP standard provides for the secure and encrypted transmission of digital signals.

3.3 About HDMI

High-Definition Multimedia Interface (HDMI) is an uncompressed all digital[3] audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality.

In particular, HDMI[4]:

- Provides a simple[5] interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single lengthy[6] cable
- Supports standard, enhanced, high-definition video, and multi-channel digital audio[7] on a single cable

1 Defined by a standard published by the Video Electronics Standards Association (VESA)

2 Developed by Intel

3 Ensuring an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions

4 HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI licensing LLC

5 With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced

6 HDMI technology has been designed to use standard copper cable construction at up to 15m

7 HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats

- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements
- Benefits consumers by providing superior, uncompressed digital video quality via a single cable[1], and user-friendly connector
- Is backward-compatible with DVI (Digital Visual Interface)
- Supports two-way communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play

HDMI has the capacity to support:

- Existing high-definition video formats (720p, 1080i, and 1080p/60), as well as standard definition formats such as NTSC or PAL

4 Your VA-2H EDID Reader-Emulator

Figure 1 and Table 1 define the unit.

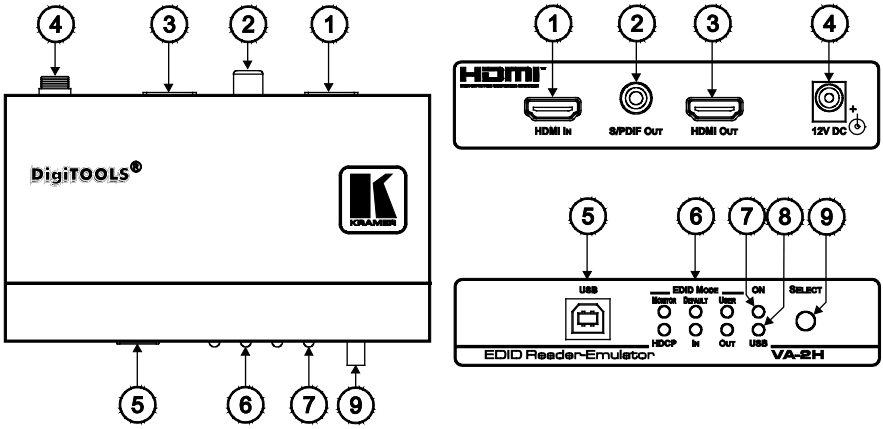


Figure 1: VA-2H EDID Reader-Emulator

1 HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

Table 1: VA-2H EDID Reader-Emulator Functions

#	Feature		Function
1	*HDMI IN* Connector		Connects to an HDMI source
2	*S/PDIF OUT* RCA Connector		Connects to a digital audio acceptor (S/PDIF)
3	*HDMI OUT* Connector		Connects to an HDMI acceptor
4	*12V DC* Connector		+12V DC for powering the unit
5	*USB* Connector		Connects to a computer
6	*EDID MODE* LEDs	*MONITOR*	Illuminates when the monitor EDID is passed to the input
		DEFAULT	Illuminates when the default EDID is passed to the input
		USER	Illuminates when the user EDID is passed to the input
		HDCP	Illuminates when HDCP is detected on the input
		IN	Illuminates when an active device is connected to the input
		OUT	Illuminates when an active device is connected to the output
7	*ON* LED		Illuminates green when receiving power
8	*USB* LED		Illuminates green when a USB source is connected
9	*SELECT* Button		Press to cycle through and select the EDID mode

5 Connecting the VA-2H EDID Reader-Emulator

To connect the **VA-2H**, as shown in Figure 2, do the following[1]:

1. Connect an input source (for example, a DVD player) to the HDMI IN connector.
2. Connect the HDMI OUT connector to the acceptor (for example, an LCD display).
3. If needed, connect the S/PDIF RCA connector to a digital audio acceptor (for example, a power amplifier with speakers).
4. If making changes to the EDID parameters, connect the USB connector to a computer.
5. Connect the power adapter to the 12V DC connector, plug the adapter into the mains and power on all external devices.

1 Switch OFF the power on each device before connecting it to your VA-2H. After connecting your VA-2H, switch on its power and then switch on the power on each device

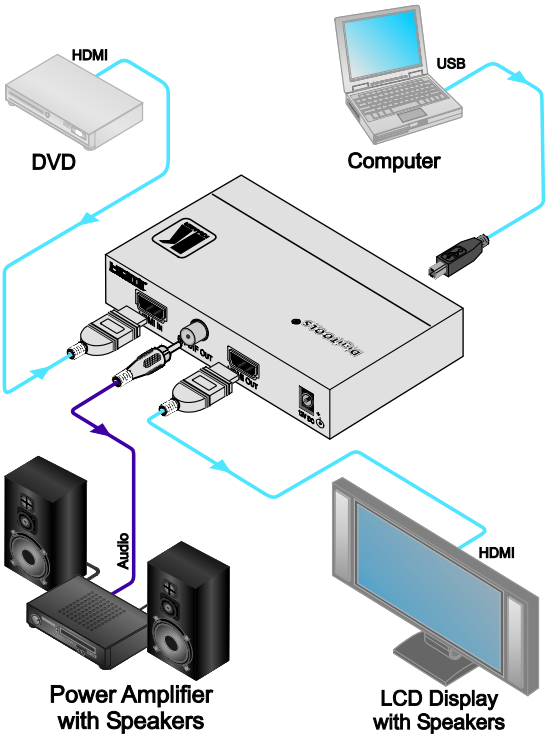


Figure 2: Connecting the VA-2H

6 Operating the VA-2H EDID Reader-Emulator

You can operate the **VA-2H** in two ways, from the:

- Front panel (see Section 6.1)
- EDID Designer (see Section 6.2)

6.1 Operating from the Front Panel

You can operate the **VA-2H** from the front panel as follows:

1. Press and hold the SELECT button, for 3 seconds, to cycle through the EDID options:

2. Press the SELECT button to select the desired EDID option:
   - When MONITOR is selected, the MONITOR LED illuminates and the EDID from the display is routed to the input port
   - When DEFAULT is selected, the DEFAULT LED illuminates and the default EDID is routed to the input port
   - When USER is selected, the USER LED illuminates and the user EDID is routed to the input port. The user EDID can be created and modified using the EDID Designer (see Section 6.2)

6.2 Operating from the EDID Designer

The EDID designer application software can be used to manipulate the EDID data.

To operate the **VA-2H** from the EDID Designer, navigate to *Command* > *Set Device Mode* and choose the mode: *OUTPUT*, *DEFAULT* or *USER*.

For a full description of how to setup and use the EDID Designer, see Section 7.

7 The EDID Designer

The EDID Designer is a PC-based program for use with the **VA-2H**. It lets you create, modify and save EDIDs on the computer and to download the EDID to USER memory and operate the **VA-2H**. It gives the AV technician a strong and flexible troubleshooting tool for diagnosing display problems.

To use the **VA-2H** EDID Designer you must:

- Download and install the USB driver (see section 7.1)
- Download and install the EDID Designer software (see section 7.2)

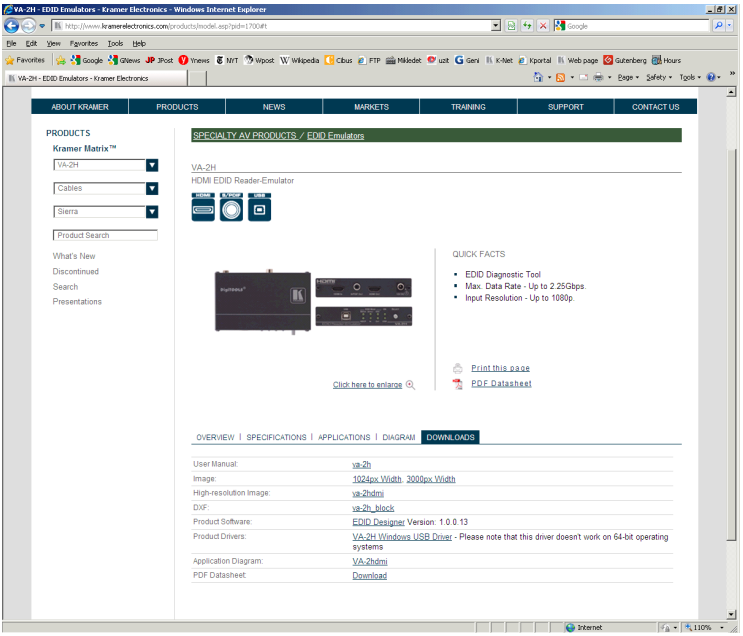
You can then use the EDID Designer (see section 7.3).

7.1 Installing the USB Driver

Note: Currently the driver only works on 32-bit systems.

To install the **VA-2H** USB driver, do the following[1]:

1. Navigate to the Kramer Web site[2], search for the product **VA-2H** and click the Downloads tab. The following screen appears:



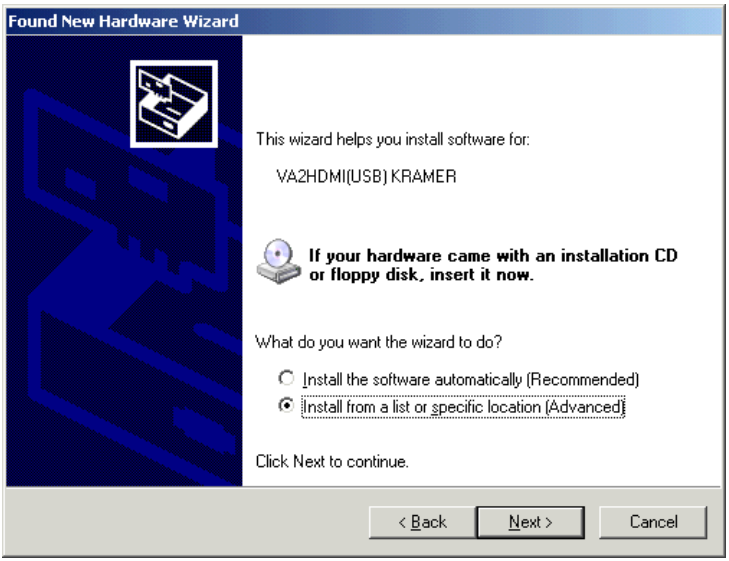
2. Download the *VA-2H Windows USB Driver* and the *EDID Designer* from the Kramer Web site to a designated folder on your computer.
3. Extract the two zipped USB driver files to your designated folder.
4. Connect the USB cable between your computer and the **VA-2H**.
5. Connect the power supply to the **VA-2H**.
6. After a few seconds the *"Found New Hardware"* message appears on your screen and the following window opens:

1 This procedure illustrates the installation on Windows® XP

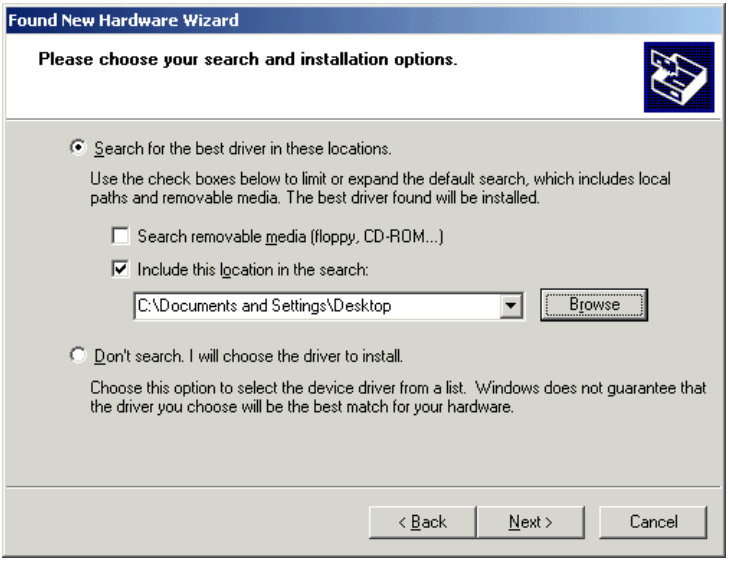
2 At http://www.kramerelectronics.com

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

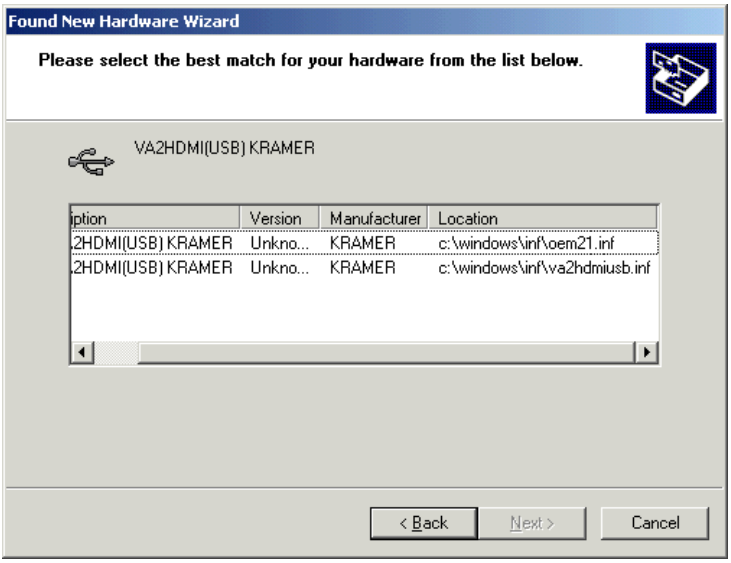
7. When asked *"Can Windows connect to Windows Update to search for software?"* select *"No, not this time"* and click **Next**.
   The following screen appears:


Found New Hardware Wizard
This wizard helps you install software for:
VA2HDMI(USB) KRAMER
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

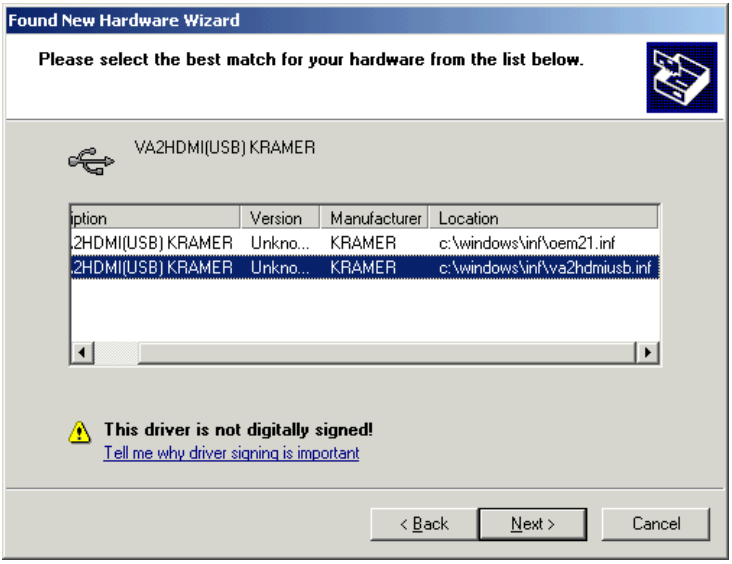
8. Select *"Install from a list or specific location (Advanced)"* and click **Next**.
   The following screen appears:


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
C:\Documents and Settings\Desktop
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

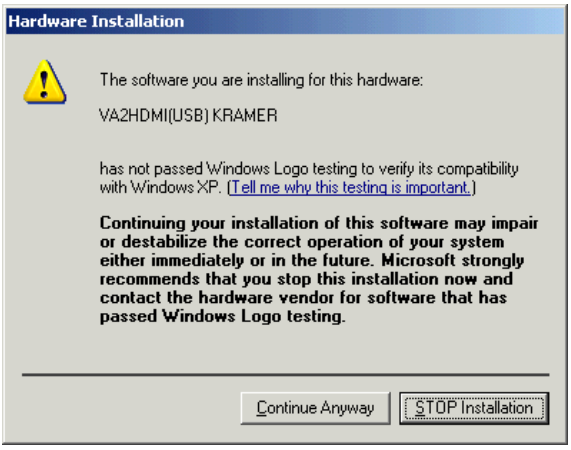
9. Select *"Search for the best driver in these locations"* and check *"Include this location in the search"*. Browse to your previously designated folder (in this example, the desktop). Click **Next**.
   The following screen appears:



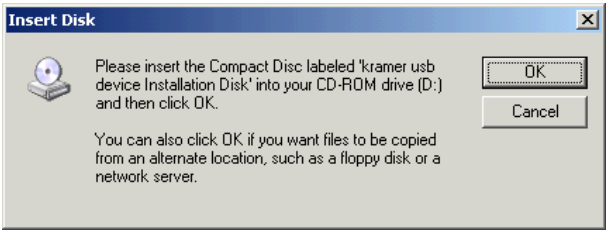
10. Select the file *c:\windows\inf\va2hdmiusb.inf*.
    The following window appears:



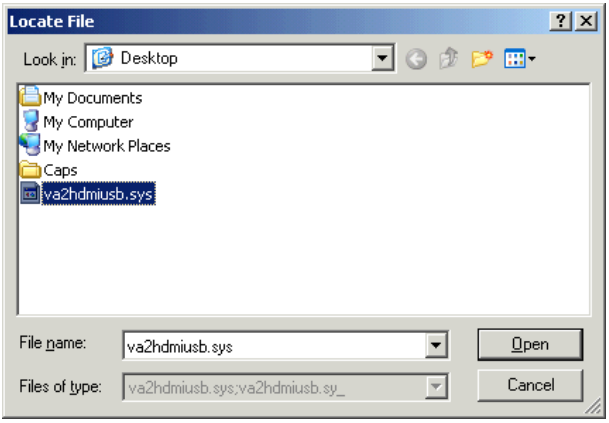
11. The warning *"This driver is not digitally signed!"* appears. Click **Next**. The following window appears:


Hardware Installation
The software you are installing for this hardware:
VA2HDMI(USB) KRAMER
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

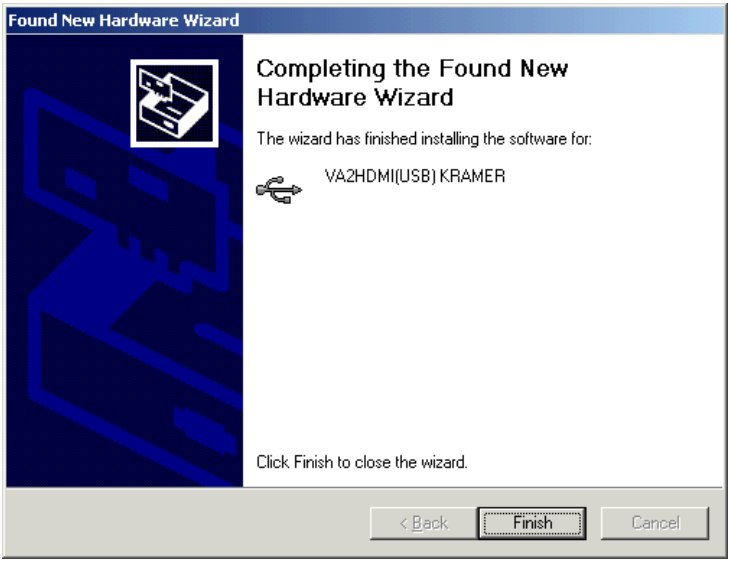
12. Ignore the warning. Click **Continue Anyway**. The following window appears:


Insert Disk
Please insert the Compact Disc labeled 'kramer usb device Installation Disk' into your CD-ROM drive (D:) and then click OK.
You can also click OK if you want files to be copied from an alternate location, such as a floppy disk or a network server.
OK
Cancel

13. Do not insert a CD. Click **OK**.
    The following window appears:



14. Select the file *va2hdmiusb.sys*. Click **Open**. The driver installs and when finished the following window appears:



15. The USB driver has been successfully installed and you can install the EDID Designer software.

7.2 Installing the EDID Designer

To install the EDID Designer, do the following:

1. Navigate to the designated folder to which you downloaded the EDID Designer in the previous section. Double-click the file *setup.exe* from this folder or from the distribution media included with the **VA-2H**.
2. After the installation completes, navigate to *Start* > *Programs* > *Kramer* > *EDID Designer* and run the EDID Designer. The main window opens:

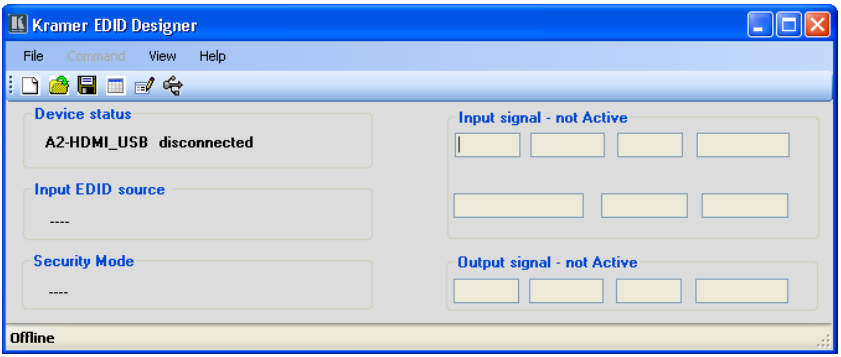


Figure 3: EDID Designer Main Window – Limited View

3. Connect a USB cable from your PC to the USB connector on the **VA-2H**.

4. To begin communication, click the button or menu item *File* > *Connect USB*.
   The Device Status on the main window changes to *USB was found* and at the lower left corner of the Main Window changes to *Online*.

7.3 Using the EDID Designer

To see the entire window and access all the EDID parameters, click *View* > *Extended View*. The main window, extended view appears:

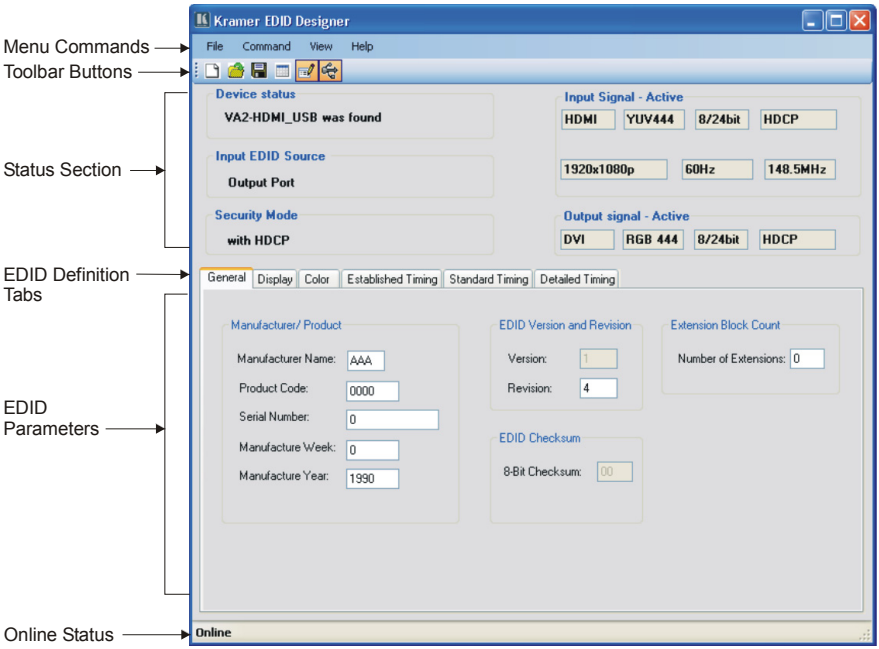


Figure 4: EDID Designer Main Window – Extended View

The main window contains the following elements:

- Menu commands, see Section 7.3.1
- Toolbar buttons, see Section 7.3.2
- Status section, see Section 7.3.3
- EDID definition tabs and EDID parameters, see Section 7.3.4
- Online status, see Section 7.3.5

7.3.1 Menu Commands

Table 2 describes the menu items of the EDID Designer.

Table 2: EDID Designer Menu Items

Menu	Item	Description
File	Connect USB	Connects or disconnects the USB
	New EDID	Creates a new EDID
	Open EDID	Opens an existing EDID
	Close EDID	Closes the existing EDID without saving
	Save EDID	Saves the current EDID
	Save EDID as…	Saves the current EDID with a different name or to a new location on disk
	Exit	Closes the EDID Designer
Command	Set Device Mode	As if pressing the SELECT button, sets the device mode to *Output*, *Default* or *User*
	Load EDID from	Loads the EDID to the EDID Designer from *Output*, *Default* ,*User or Input*
	Download EDID to	Loads the EDID from the EDID Designer to the *In Port* or *User* memory
	Security Mode	*With HDCP* passes HDCP encoding, *Without HDCP* turns off HDCP encoding for 60 seconds only to allow the signal that is not encoded to pass
	Reset	Resets the device
View	Extended View	Expands the window to show the EDID definition tabs
	Limited View	Shrinks the window to hide the EDID definition tabs
	Edit EDID	Select read only/modify
	Byte Viewer	Displays the Byte Viewer window
Help	About	Displays the version of the EDID Designer

7.3.2 Toolbar Buttons

Table 3 describes the toolbar buttons of the EDID Designer.

Table 3: EDID Designer Toolbar Buttons

Button	Description
	Creates a new EDID for editing
	Opens an existing EDID from the disk
	Saves the current EDID to the disk
	Displays the Byte Viewer window to edit the hex codes
	Toggles Read-only/Modify, to disallow or allow editing of the EDID
	Connects or disconnects the USB connection to the computer

7.3.3 Status Section

Table 4 describes the status section of the EDID Designer.

Table 4: EDID Designer Status Section

Field	Description
Device Status	Indicates if the USB connection has been detected or is disconnected
Input EDID Source	Indicates the EDID source
Security Mode	Indicates if HDCP is active or blocked (for 60 seconds)
Input Signal	Indicates if active or inactive
Output Signal	Indicates if active or inactive

7.3.4 EDID Definition Tabs and Parameters

Table 5 describes the EDID definition tabs. The EDID parameters shown for each tab are only illustrated in Figure 5 to Figure 10.

For full information about the EDID definitions found in the EDID parameter sections, refer to the VESA Enhanced Extended Display Identification Data Standard[1].

Table 5: EDID Definition Tabs

Tab	Description	See
General	Contains general definitions about the display and its EDID	Figure 5
Display	Contains detailed definitions of the video input and the image size	Figure 6
Color	Contains detailed definitions of color support	Figure 7
Established Timing	Contains detailed definitions of resolution and timing	Figure 8
Standard Timing	Allows the user to define 8 preset timing schemes	Figure 9
Detailed Timing	Allows the user to define detailed timing schemes	Figure 10

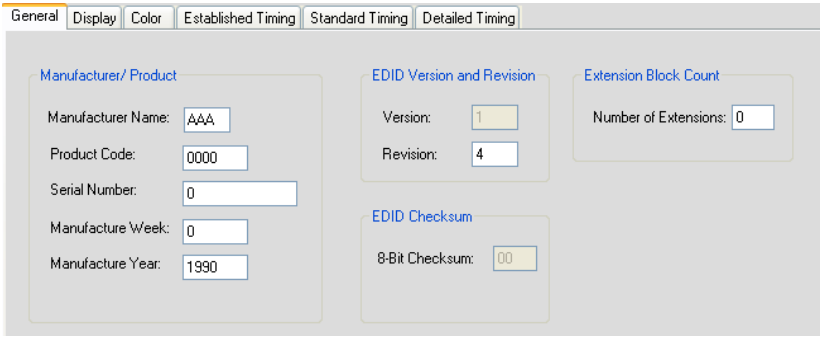


Figure 5: EDID Designer – General Tab

1 Available from www.vesa.org

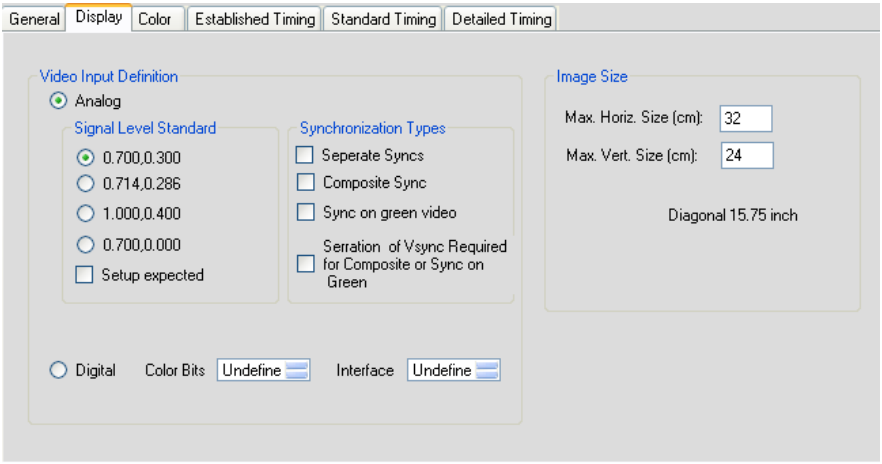


Figure 6: EDID Designer – Display Tab

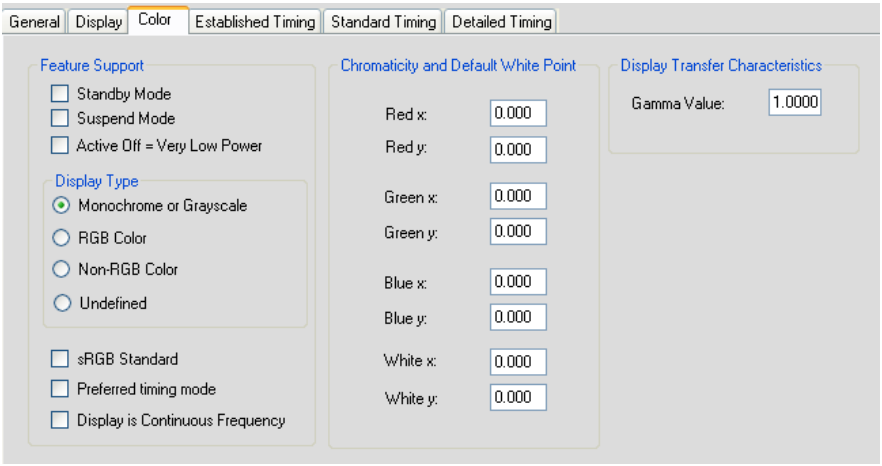


Figure 7: EDID Designer – Color Tab

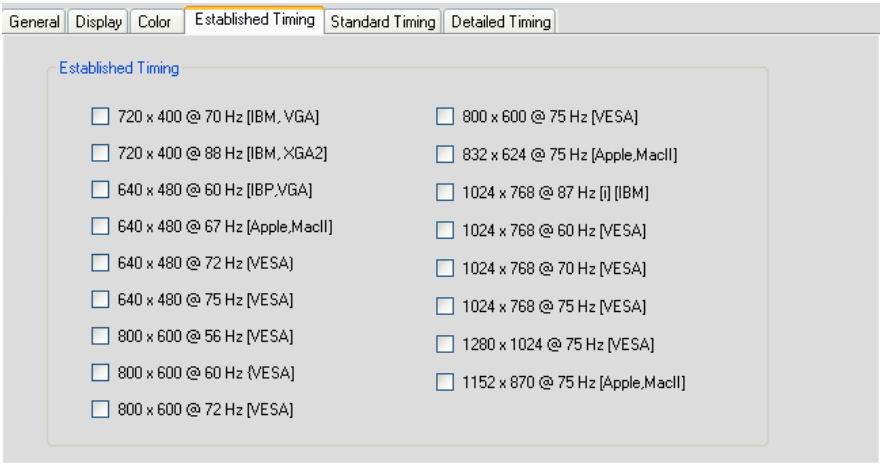

General
Display
Color
Established Timing
Standard Timing
Detailed Timing
Established Timing
720 x 400 @ 70 Hz [IBM, VGA]
720 x 400 @ 88 Hz [IBM, XGA2]
640 x 480 @ 60 Hz [IBP,VGA]
640 x 480 @ 67 Hz [Apple,MacII]
640 x 480 @ 72 Hz [VESA]
640 x 480 @ 75 Hz [VESA]
800 x 600 @ 56 Hz [VESA]
800 x 600 @ 60 Hz [VESA]
800 x 600 @ 72 Hz [VESA]
800 x 600 @ 75 Hz [VESA]
832 x 624 @ 75 Hz [Apple,MacII]
1024 x 768 @ 87 Hz [i] [IBM]
1024 x 768 @ 60 Hz [VESA]
1024 x 768 @ 70 Hz [VESA]
1024 x 768 @ 75 Hz [VESA]
1280 x 1024 @ 75 Hz [VESA]
1152 x 870 @ 75 Hz [Apple,MacII]

Figure 8: EDID Designer – Established Timing Tab

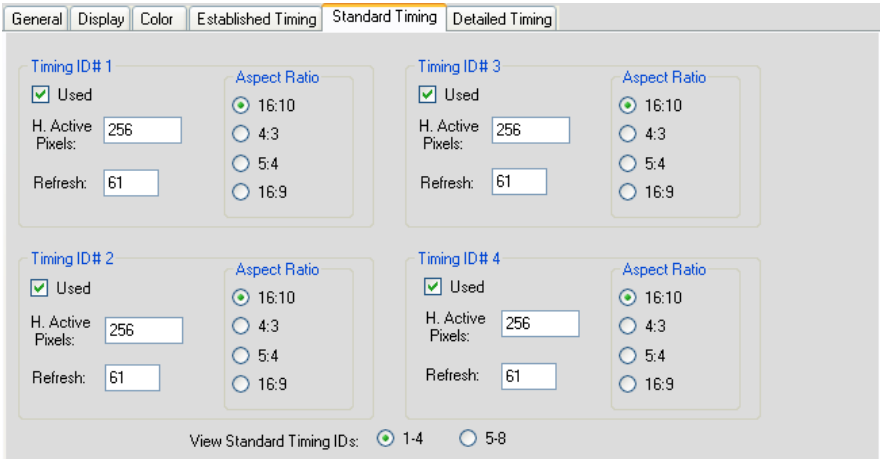


Figure 9: EDID Designer – Standard Timing Tab

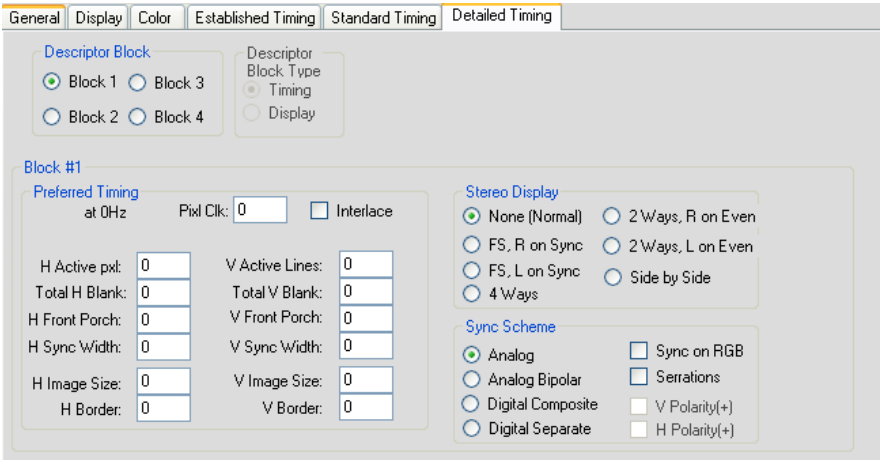


Figure 10: EDID Designer – Detailed Timing Tab

7.3.5 Online Status

The online status indicates whether the **VA-2H** is *Online* and available for downloading, uploading or operation or is *Offline*.

8 Technical Specifications

The **VA-2H** technical specifications are shown in Table 6:

Table 6: VA-2H Technical Specifications[1]

INPUT:	1 HDMI connector
OUTPUTS:	1 HDMI connector; 1 S/PDIF digital audio on an RCA connector
PORT:	1 USB connector
BANDWIDTH:	Supports up to 2.25Gbps bandwidth per graphic channel
COMPLIANCE WITH HDMI STANDARD:	Supports HDMI and HDCP
RESOLUTION:	Up to UXGA; 1080p, 36bit
POWER SOURCE:	12V DC, 410mA
CONTROLS:	SELECT button, EDID MODE LEDs
DIMENSIONS:	12cm x 7.2cm x 2.4cm (4.7" x 2.8" x 1.0") W, D, H
WEIGHT:	0.3kg (0.7lbs)
ACCESSORIES:	Power supply, power cord, Windows®-based control software
OPTIONS:	RK-3T 19" rack mount adapter

1 Specifications are subject to change without notice

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC* Rules and Regulations: Part 15: "Radio frequency devices Subpart B Unintentional radiators"

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

* FCC and CE approved using STP cable (for twisted pair products)

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com where updates to this user manual may be found.
We welcome your questions, comments and feedback.

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-000677 REV 2